

Appl. No.: 10/807,846
Art Unit: 1712; Docket No.: B03-31
Reply to Office Action of August 19, 2005

REMARKS

Claims 1-4, 7, 8, 10, 12, 13 and 25-38 appear in this application for the Examiner's review and consideration.

Claim 1 has been amended to recite that the amount of trans structure in the trans polybutadiene is limited to 20% to 60%; that the vinyl content of the solution converted polybutadiene is less than 7%; and that the sensitizer is selected from the group consisting of allyl bromide, carbon tetrabromide, bromobenzene, phenyl sulfide, allyl sulfide, phenyl disulfide, isobutyl disulfide, allyl mercaptan, thio-2-naphthol and elemental bromine.

Claim 25 has been amended to recite mixing an amount of a photo-sensitizer with the polybutadiene in solution; exposing the mixture to a source of radiation for a sufficient amount of time to increase the amount of *trans*-polybutadiene in the polybutadiene in solution to a level of 20% to 60%; and recovering the polybutadiene which comprises less than 7% vinyl isomer and is substantially free of crosslinking, cyclization and gel formation;

Claims 12 and 36 have been amended to correct their dependency.

Claims 5, 6, 9, 11, 31, 32, 35, and 38 have been canceled and claims 14-24 and 39-55 have been withdrawn without prejudice to Applicants' right to file one or more continuing applications directed to any subject matter not presently claimed.

No new matter has been added by these amendments.

Rejection Under 35 U.S.C. § 112, Second Paragraph

Claims 5-6 were rejected under 35 U.S.C. § 112, second paragraph. Claims 5-6 have been canceled, rendering the rejection moot. The rejection under 35 U.S.C. § 112, second paragraph is, therefore, believed to have been overcome. Applicants respectfully request reconsideration and withdrawal thereof.

Rejections Over Yokota '295

Claims 1, 3-7, and 10-13 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Yokota '295.

Yokota is generally directed to blending high *trans*-butadiene rubber (butadiene rubber having >60% *trans* isomer) with an ionomer to make a cover for a golf ball. This is not the solution converted *trans* butadiene rubber of the present invention. Yokota fails to disclose all

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elements of Applicants' independent claim 1, including isomerization of a solution of polybutadiene and a sensitizer such that the solution-converted product has a trans isomer content of 20% to 60%; that the vinyl content of the solution converted polybutadiene is less than 7%; and that the sensitizer is selected from the group consisting of allyl bromide, carbon tetrabromide, bromobenzene, phenyl sulfide, allyl sulfide, phenyl disulfide, isobutyl disulfide, allyl mercaptan, thio-2-naphthol and elemental bromine.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to modify the reference or combine the teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art, not in Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 493, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Yokota does not disclose, or even suggest, the elements recited in claim 1 of the present invention, and the trans butadiene/ionomer blend teaches away from the solution-converted trans butadiene rubber of Applicants. First, Yokota says that it is not necessary to consider the 1,2-addition (vinyl content) since the 1,4-addition (meaning both cis and trans content) occurs more preferentially. While it is true that the 1,4 content is preferential, in the example in Table 2, Yokota uses TP-049 (which is believed to be Furen 88 from the same company, which is about 12% vinyl) a relatively low molecular weight (see footnote on Table 2) trans polybutadiene. Applicants' vinyl content is important to the invention since we are co-agent/peroxide curing – Yokota is simply blending a high trans (plastic) BR with ionomer. No curatives are found in Table 2, and Yokota specifically claims an un-vulcanized cover blend. Second, Yokota states that (col. 3 line 55) "when polybutadiene having a trans-1,4-structure is used in an amount of less than 60%, the hardness is too soft" (*i.e.*, because it wouldn't be a plastic any more). Independent claim 1 now recites 20% to 60% trans isomer in the solution-converted butadiene so that the material will not become a plastic.

Moreover, Yokota also states that molecular weights above 300,000 are bad and should be below 200,000. Applicants' rubber has a molecular weight of at least 200,000, preferably at least 250,000, more preferably between 300,000 and 500,000, because Applicants are not dealing

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with a plastic material and will not suffer the processing and durability problems that Yokota realizes by going over 300,000.

The rejections under 35 U.S.C. §§ 102(b) and 103(a) are believed to have been overcome for at least the above reasons. Applicants respectfully request reconsideration and withdrawal thereof.

Rejections Over Bissonnette '837

Claims 1-7, and 10-13 were rejected under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Bissonnette '837. Bissonnette '837 is generally directed to a polymeric composite including a nanoparticulate. In one embodiment, the polymeric composite includes a polybutadiene having a trans content of at least 70% trans isomer (see claim 24). Because the composition of Bissonnette '837 is formed from two essentially incompatible polymers it will need to be compatibilized.

This is not the solution converted trans butadiene rubber of the present invention. Bissonnette '837 fails to disclose all elements of Applicants' independent claim 1, including isomerization of a solution of polybutadiene and a sensitizer such that the solution-converted product has a trans isomer content of 20% to 60% and that the sensitizer is selected from the group consisting of allyl bromide, carbon tetrabromide, bromobenzene, phenyl sulfide, allyl sulfide, phenyl disulfide, isobutyl disulfide, allyl mercaptan, thio-2-naphthol and elemental bromine.

Further, claim 1 of the present invention has been amended to recite a golf ball comprising a layer consisting essentially of a material formed from the isomerization of a solution of polybutadiene and a sensitizer by a radiation source to form a solution-converted polybutadiene that comprises 20% to 60%. This claim language excludes the other components of Bissonnette '837 which have a material affect on the composition.

The rejections under 35 U.S.C. §§ 102(e) and 103(a) are believed to have been overcome for at least the above reasons. Applicants respectfully request reconsideration and withdrawal thereof.

Rejections Over Bissonnette '834

Claims 1-7, and 10-13 were rejected under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Bissonnette '834. Bissonnette '834

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does not disclose all elements recited in independent claim 1 of the present invention, nor does it even suggest or teach them, directly or indirectly.

One of ordinary skill in the art would understand that the reality of Bissonnette '834 is that although attempting to end up with a high trans, low vinyl, high molecular weight, low polydispersity, and low branching rubber, at best the result will be maybe 3 out of those 5 features, or the samples will contain high volatiles or other low molecular weight tails.

The advantage and difference of the present invention over Bissonnette '834 is that Applicants know up-front that the polymer that is to be solution-converted is an otherwise very good golf ball polymer and that the conversion will make it better. No exotic polymerization catalysts or extreme polymerization conditions are needed. Since the solution conversion in the present application is done right after polymerization, while the polymer is still in solution, this is a more commercially viable process as well.

The rejections under 35 U.S.C. §§ 102(e) and 103(a) are believed to have been overcome for at least the above reasons. Applicants respectfully request reconsideration and withdrawal thereof.

Rejection Over Yokota '295 Bissonnette '837, or Bissonnette '837 in view of Golub '175

Claims 1-13 and 25-38 were rejected under 35 U.S.C. § 103(a) as being obvious over Yokota '295, Bissonnette '837, or Bissonnette '837 in view of Golub '175.

Golub is generally directed to a method for isomerizing cis 1,4 structures in polybutadiene to trans 1,4 structures. Golub fails to disclose or suggest mixing an amount of a photo-sensitizer with the polybutadiene in solution under an inert atmosphere and that the resultant solution-converted polybutadiene is substantially free of crosslinking, cyclization and gel formation. Golub also fails to disclose or even suggest solution conversion. Yokota, Bissonnette '837 and Bissonnette '834 fail to cure the deficiencies of Golub. As stated above, none of those references (or their combination with Golub) disclose the elements recited in independent claim 1 of the present invention and they certainly fail to disclose or even suggest the method steps recited in independent claim 25 of the present invention.

The rejection under 35 U.S.C. § 103(a) is believed to have been overcome for at least the above reasons. Applicants respectfully request reconsideration and withdrawal thereof.

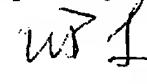
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CONCLUSION

Based on the remarks set forth above, Applicants believe that all of the rejections have been overcome and the claims of the subject application are in condition for allowance. Should the Examiner have any further concerns or believe that a discussion with the Applicants' attorney would further the prosecution of this application, the Examiner is encouraged to call the agent/attorney at the number below.

A fee of \$450.00 is believed to be due for this submission for the Petition for Extension of Time - 2 months. Please charge this and any other required fees to the Acushnet Company Deposit Account No. 502309.

Respectfully submitted,



Date: January 19, 2006

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